CLAIMS

1. A heat-resistive catalyst comprising:

a composite particle comprising a noble metal particle, and a co-catalytic metal compound particle contacting as a metal with the noble metal particle; and

a substrate carrying the noble metal particle and the co-catalytic metal compound particle.

2. A heat-resistive catalyst comprising:

a composite particle comprising a noble metal particle, and a co-catalytic metal compound particle contacting as an oxide with the noble metal particle; and

a substrate carrying the noble metal particle and the co-catalytic metal compound particle.

3. The heat-resistive catalyst as claimed in claim 1, wherein the co-catalytic metal compound particle comprises a transition metal compound.

4. The heat-resistive catalyst as claimed in claim 2, wherein the co-catalytic metal compound particle comprises one of a rare earth element compound and a compound containing Zr.

5. The heat-resistive catalyst as claimed in claim 1 or 2, wherein the substrate comprises a porous oxide having a surface carrying the composite particle.

6. The heat-resistive catalyst as claimed in claim 1 or 2, wherein

the substrate comprises at least one porous oxide selected from among an alumina, a cerium oxide, a titanium oxide, a zirconia, and a silica.

7. The heat-resistive catalyst as claimed in claim 1 or 2, wherein the noble metal particle comprises at least one metal selected from among Ru, Rh, Pd, Ag, Ir, Pt, and Au.

8. The heat-resistive catalyst as claimed in claim 1 or 2, wherein the co-catalytic metal compound particle comprises a transition metal compound containing at least one transition metal selected from among Fe, Co, Ni, Cu, Ti, and W.

9. A production method of heat-resistive catalyst, comprising:

having a noble metal salt aqueous solution and a co-catalytic metal salt aqueous solution concurrently provided in a reverse micelle,

preparing reverse micellar solution containing a noble metal precursor and a co-catalytic metal precursor; and

having a substrate carrying a composite particle comprising the noble metal precursor and the co-catalytic metal precursor concurrently reduced as a noble metal particle and a co-catalytic metal particle, respectively.

10. The production method of heat-resistive catalyst as claimed in claim 9, comprising providing a reductant to the emulsion, concurrently reducing the noble metal precursor and the co-catalytic metal precursor in the reverse micelle, forming the composite particle.

11. The production method of heat-resistive catalyst as claimed in claim 9, comprising:

mixing, in the reverse micelle, a hydrolyzate of alkoxide as a precursor of a porous oxide forming the substrate, having a mixture; and

firing the mixture, before carrying the composite particle by a surface of the porous oxide.

12. The production method of heat-resistive catalyst as claimed in claim 9, comprising mixing, in the reverse micelle, an aqueous solution of a precursor salt of a porous oxide forming the substrate and a precipitating agent or an insolubilizing agent for precipitating or insolubilizing the precursor salt of the porous oxide as a hydroxide, before a firing to carry the composite particle by a surface of the porous oxide.

13. The production method of heat-resistive catalyst as claimed in claim 9, comprising dispersing, in the emulsion, powder of a porous oxide forming the substrate, before a firing to carry the composite particle by a surface of the porous oxide.

14. The production method of heat-resistive catalyst as claimed in claim 9, wherein the noble metal salt aqueous solution comprises a metal salt aqueous solution of at least one metal selected from among Ru, Rh, Pd, Ag, Ir, Pt, and Au.

15. The production method of heat-resistive catalyst as claimed in claim 9, wherein the co-catalytic metal salt aqueous solution comprises a metal salt aqueous solution of at least one metal selected from among Fe, Co, Ni, Cu, Ce, Zr, La, Ti and W.

16. The production method of heat-resistive catalyst as claimed in claim 9, wherein the substrate comprises a porous oxide containing at least one oxide selected from among an alumina, a cerium oxide, a titanium oxide, a zirconia, and a silica.